U.S. Chemical Safety and Hazard Investigation Board

Impact Report

FY 2016

U.S. CHEMICAL SAFETY AND HAZARD INVESTIGATION BOARD

The U.S. Chemical Safety and Hazard Investigation Board (CSB) is an independent federal agency whose mission is to drive chemical safety change through independent investigations to protect people and the environment. The CSB advocates for the implementation of the resulting safety recommendations to better protect workers, the public and the environment. The vision of the CSB is to create a nation safe from chemical disasters. This report highlights the CSB's impact of activities undertaken in fiscal year (FY) 2016 to achieve this vision.

INVESTIGATIONS

The CSB conducts incident investigations and safety studies concerning releases of hazardous chemical substances. Throughout FY 2016, investigative field work and analysis have continued on several important open accident investigations. The CSB deployed to four chemical incidents in FY 2016. The CSB anticipates that it will continue to advance these investigations in FY 2017.

FY 2016 COMPLETED REPORTS

Caribbean Petroleum Refining Tank Explosion and Fire (Bayamón, PR): On October 23, 2009, a massive explosion occurred at the Caribbean Petroleum Corporation, or CAPECO, terminal facility near San Juan, Puerto Rico. The CSB's final report issued recommendations for addressing regulatory gaps in safety oversight of petroleum storage facilities by the Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA). **The final report was released at an October 21, 2015, public business meeting in Washington, DC.**

West Fertilizer Explosion and Fire (West, TX): On April 17, 2013, the West Fertilizer fire and explosion in West, Texas, resulted in 15 fatalities, more than 260 injuries, and an estimated $230 million in community damage. The deadly fire and explosion occurred when approximately thirty tons of fertilizer grade ammonium nitrate (FGAN) exploded after being heated by a fire at the storage and distribution facility. The CSB made recommendations to address a lack of awareness of hazardous chemicals and emergency preparedness. **The final report was released at a public meeting on January 28, 2016.**

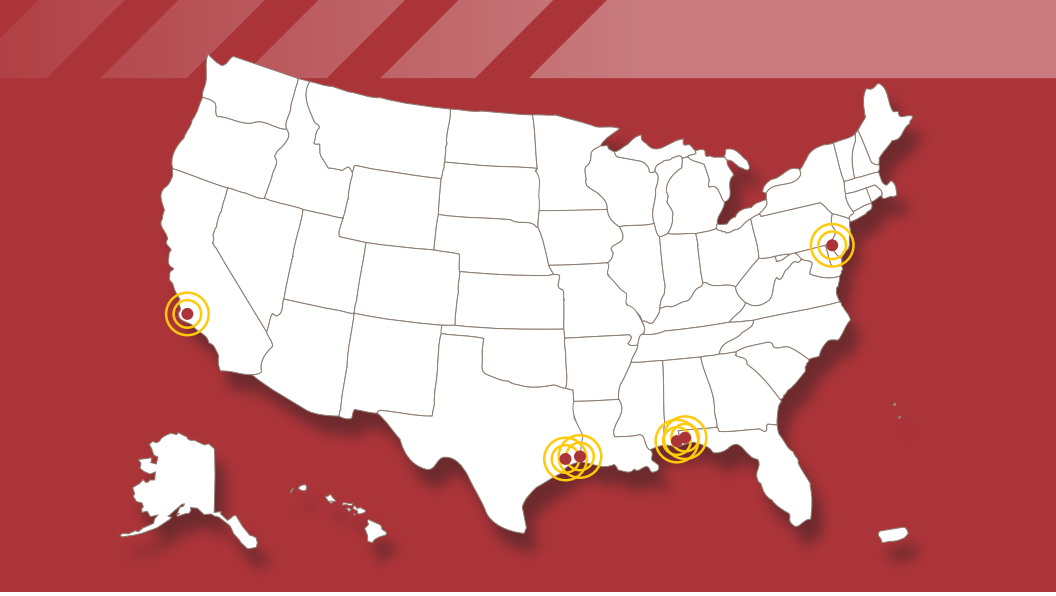
Macondo Blowout and Explosion (Gulf of Mexico): On April 20, 2010, a complex interplay of physical, operational, and organizational barriers failed, sending oil and gas from deep below the ocean floor onto the drilling rig, triggering explosions and an ensuing fire that left 11 of the 126 workers dead and critically injured at least 17 others. Volumes III and IV of the report included proposed safety recommendations to the U.S. Department of Interior's Bureau of Safety and Environmental Enforcement (BSEE), the American Petroleum Institute, the Ocean Energy Safety Institute, and the Sustainability Accounting Standards Board. **The final report was released on April 20, 2016.**

Tesoro Martinez (Martinez, CA): On February 12, 2014, an incident occurred at the Tesoro Refinery in Martinez, California, which burned two workers and released an estimated 84,000 pounds of sulfuric acid. Less than a month later, on March 10, 2014, sulfuric acid sprayed and burned two contract workers during the removal of piping. Both incidents occurred in the alkylation unit – where high-octane blending components are produced for gasoline. The CSB's case study examines the Tesoro Martinez Refinery through the evaluation of previous incidents, worker statements, gaps in safety standards, deviations from established procedures and practices, and past efforts to assess and strengthen site safety culture. **The final report was released at a news conference on August 2, 2016.**

Freedom Industries Chemical Release (Charleston, WV): On the morning of January 9, 2014, an estimated 10,000 gallons of crude methylcyclohexanemethanol (MCHM) mixed with propylene glycol phenyl ethers (PPH Stripped) were released into the Elk River when a 46,000-gallon storage tank located at the Freedom Industries site in Charleston, WV, failed, disrupting the drinking water supply for approximately 300,000 residents in nine counties. The CSB's report highlights lessons learned and is calling on aboveground storage tank facilities, government officials, drinking water utilities and public health agencies across the country to follow recommended best practices in order to prevent similar incidents. **The final report was released at a public meeting on September 28, 2016.**

Safety Alert: Preventing High Temperature Hydrogen Attack (HTHA): In the absence of industry guidance that incorporates key findings from the Tesoro Anacortes 2010 heat exchanger failure, the CSB issued a safety alert to provide additional direction for the industry to prevent the damage mechanism HTHA. **The bulletin was released on August 11, 2016.**

Williams Olefins Plant Fire and Explosion (Geismar, LA): On June 13, 2013, an explosion and fire occurred at the Williams Olefins plant during non-routine operational activities that introduced heat to the reboiler, which was offline and isolated from its pressure relief device. The heat increased the temperature of a liquid propane mixture confined within the reboiler, resulting in a dramatic pressure rise within the vessel. The reboiler shell catastrophically ruptured, causing a boiling liquid expanding vapor explosion (BLEVE) and fire, which killed two workers; 167 others reported injuries, the majority of which were contractors. The CSB's report highlighted the importance of using risk reduction strategies, such as the "hierarchy of controls"; establishing a strong organizational process safety culture; and developing a robust process safety management program. **The final report was approved on September 26 and released at a news conference on October 19, 2016.**



FY 2016 OPEN INVESTIGATIONS

Investigation	Location	Incident Date
DuPont LaPorte Facility Toxic Chemical Release	La Porte, TX	Nov 15, 2014
Exxon Mobil Refinery Explosion	Torrance, CA	Feb 18, 2015
Delaware City Refining Company	Delaware City, DE	Nov 29, 2015
Enterprise Product Partners	Pascagoula, MS	Jun 27, 2016
Sunoco	Nederland, TX	Aug 12, 2016
Airgas	Cantonment, FL	Aug 28, 2016

RECOMMENDATIONS

CSB investigations produce high-impact recommendations to regulatory agencies, state and local governments, corporations, industry organizations and others, aiming to drive chemical safety and environmental protection. The CSB advocates for timely implementation of these recommendations. During FY 2016, implementation of CSB recommendations resulted in key safety improvements. For example, as a result of the CSB's West Fertilizer investigation, the CSB made recommendations to Federal Emergency Management Agency (FEMA) within the Department of Homeland Security (DHS) to create a funding mechanism that would provide training and curriculum development for first responders on response to ammonium nitrate incidents. On September 16, 2016, FEMA awarded two grants of one million dollars each to the Georgia Tech Research Institute (GTRI) and the International Association of Fire Fighters (IAFF) to develop and deliver HAZMAT training, focusing on FGAN hazards in accordance with the CSB's recommendations.

783	191	592	30	42
TOTAL AS OF FY16	OPEN–TOTAL	CLOSED–TOTAL	CLOSED FY16	ISSUED FY16

ADVOCACY AND OUTREACH INITIATIVES

During FY 2016, the CSB continued to advocate for the implementation of its safety recommendations by engaging with recipients and stakeholders and presenting on safety topics at conferences, professional society and stakeholder meetings.

In FY 2016, CSB Board members presented at 85 conferences, professional society and stakeholder meetings, as compared to 17 events in FY 2015, including new untapped audiences. Investigators and other staff members presented at 25 conference and stakeholder meetings, many relating to the CSB's Drivers of Critical Chemical Safety Change topics.

DRIVERS OF CRITICAL CHEMICAL SAFETY CHANGE[1]

During fiscal year 2016, the Board voted to add two new issues to the Drivers of Critical Chemical Safety Change list, bringing the list to four items: Combustible Dust, Modernization of Process Safety Management, Preventive Maintenance, and Emergency Planning and Response. The goal of the program is to pursue implementation of changes that are most likely to achieve important national-level safety improvements.

The first issue that the Board voted to add is the need for more robust Preventive Maintenance programs. The CSB found that inadequate mechanical integrity programs, delayed or deferred preventive maintenance, and the ageing infrastructure of equipment at chemical facilities has been a recurring root cause of incidents. The CSB made numerous recommendations to address gaps in facility, corporate, regulatory programs and industry standards. These recommendations aim to ensure that damage mechanisms are promptly identified and prevented, equipment replacement and upgrades are not delayed, and equipment is not operated beyond its integrity operating window.

The second issue that the Board added is Emergency Planning and Response. Inadequate or poor emergency planning or response is a recurring finding in CSB investigations. To date, 15 CSB investigations have found deficiencies in a community's, facility's or emergency responder's response to an incident at a chemical facility.

[1] Formerly the "Most Wanted Safety Improvements Program." In August 2016, the Board changed the name to reflect stakeholder feedback and align with the strategic plan.

FY 2016 NUMBERS

2 new safety videos

5 investigation meetings

6 business meetings

85 presentations by the Board to stakeholders

25 presentations by staff members to stakeholders

42 new recommendations

30 closed recommendations

4 deployments initiated

6 final reports issued

1 safety alert issued

STRATEGIC PLAN

In FY 2016, the CSB completed its 2017-2021 Strategic Plan, providing guidance as the CSB completes timely investigations of chemical incidents and drives chemical safety change. With the new Strategic Plan, the agency refined its mission and vision statements and goals for completing agency objectives. With the successful execution of its mission and goals, the CSB will continue to share critical and timeless safety lessons with industry, workers, and the public to help reach the shared responsibility of creating a nation safe from chemical disasters.

MISSION

Drive chemical safety change through independent investigations to protect people and the environment.

VISION

A nation safe from chemical disasters.

GOALS

- **Goal 1:** Prevent recurrence of significant chemical incidents through independent investigations.
- **Goal 2:** Advocate safety and achieve change through recommendations, outreach and education.
- **Goal 3:** Create and maintain an engaged, high-performing workforce.

EN ESPAÑOL

The CSB believes that the agency's knowledge and impact can reach a wider audience by offering Spanish language products. In FY 2016, the CSB began offering safety information and lessons learned in Spanish. The first Spanish language news releases included the final investigation report into the massive explosion and fire that occurred in 2009 at the Caribbean Petroleum terminal facility near San Juan, Puerto Rico, and another regarding the ongoing investigation into the fatal methyl mercaptan release that took place in 2014 at DuPont's pesticide manufacturing plant in La Porte, Texas. So far, the CSB has released 12 safety videos with Spanish subtitles, eight safety digests from previous investigations and continues to work on additional translations.

SAFETY VIDEOS

The CSB distributes computer-animated safety videos free of charge within the United States to disseminate investigative findings. The agency makes the videos available on the CSB website and on YouTube for public viewing. In FY 2016, the CSB released two new videos:

- The full CSB Safety Video of the Caribbean Petroleum incident called "Filling Blind"; and
- "Dangerously Close: Explosion in West, Texas" depicting the 2013 fire and explosion at West Fertilizer in West, Texas.

ONLINE OUTREACH

Youtube • The CSB's safety videos have totaled over 1.3 million views with over 7 million minutes watched. **@USCSB:** 15,638 subscribers (as of 10/5/2016)

Twitter • **@chemsafetyboard**: 3,494 followers (as of 10/5/2016)

Facebook • **@US Chemical Safety Board**: 4,949 likes (as of 10/5/2016)

Email • Over 5,800 email users have subscribed to receive CSB new releases.

Website • **www.csb.gov** • Our website provides information on investigations, status of recommendations and information on Board activities.

U.S. Chemical Safety and Hazard Investigation Board

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